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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/572,753

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Hajime Nakamura

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/572,753	Applicant(s) NAKAMURA ET AL.	
	Examiner Matthew E. Hoban	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/21/2006 6/21/2006 6/21/2007 11/30/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 4-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim in 7,163,591.

Kim teaches a method of preparing R-Fe-B type magnets from magnet scraps and a rare earth fluoride powder.

Regarding Claim 1: The method begins in Column 3 of the document where R-Fe-B sintered magnets or scraps thereof are mechanically crushed to between 50-500 micron powders. These powders are thus the "magnet form" as stated in the claim being that a powder is a magnetic form and this powder has already gone through a sintering process. Rare earth fluorides such as Dysprosium Fluoride, Neodymium Fluoride, and Praseodymium Fluoride are then mixed with the sintered magnetic powders. These mixed powders are then heat treated at between 500-1100C in a vacuum or an inert gas atmosphere (See Lines 27-37 of Column 3). Kim later states that the sintering temperature of the magnets is

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1100C, making the heat treatment temperature lower than the sintering temperature of the magnets (See Column 4, Line 4).

Regarding Claim 4: The filling factor of the rare earth fluoride as used by Kim is at least 10% which is evidenced by the fact that the surrounding space contains no other fillers aside from the rare earth fluorides. Thus the filling factor of the rare earth fluoride as compared to other fillers would be greater than 10% and would be nearly 100%.

Regarding Claim 5: The particle size of the fluoride as used by Kim is between .1 and 50 microns as evidenced by line 36 of column 3.

Regarding Claim 6: At column 5, Lines 17-25 Kim gives several options for the R-fluoride useful in his invention including fluorides where R is Dy. A broader embodiment of his invention at Lines 40-45 of Column 3 also includes Tb as a suitable R type element. Therefore if only Dy or Tb fluoride is used the atomic percent of Dy or Tb in these powders would be 25%, based on the fact that stoichiometrically this powder is comprised of 3 fluoride atoms per every 1 R atom.

Regarding Claim 7: As stated previously, Kim gives a method in Column 3 where R-fluoride powders are heat treated in conjunction with R-Fe-B magnets. This heat treatment would inherently create diffusion of both R and fluoride

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Atoms into the R-Fe-B magnet and vice versa, meaning that some amount of Fluorine would inherently be absorbed by the magnetic particles.

Regarding Claim 8: At Column 4, Line 57-62 Kim draws particular attention to the Nd-Fe-B magnet system. This system is characterized by the formula $\text{Nd}_2\text{FeB}_{14}$. Therefore, this magnet contains 11.6 at% Nd. Although other formulae are known with slightly higher conc. of rare earth.

Kim goes on to draw particular attention to the effects of Dysprosium Fluoride, where this fluoride is used to increase and maximize iHc of the sintered magnetic form. Dysprosium Fluoride contains 25 at% Dy and contains 0 at% Nd (See Column 5, Lines 25-28). Thus a system using Nd-Fe-B as a sintered magnetic form and Dysprosium Fluoride as an additive meets all the limits of Claim 8.

Regarding Claim 9: Kim teaches using only R-Fluorides in the additive, which are comprised only of such fluorides. Thus the balance could be considered to be composed of nitrides, oxides, hydroxides and hydrides of R, since compounds such as oxides and hydroxides would be common impurities. Nevertheless, Kim teaches powders comprising entirely R-Fluorides so the balance of the composition outside of R-Fluorides would essentially be 0. The claim language does not necessarily state that the powder can not be entirely comprised of

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Fluoride and therefore does not necessitate the inclusion of nitrides, oxides, hydrides, carbides, or hydroxides.

Regarding Claim 10: Kim teaches at column 6, lines 5-15 that an aging process is used on the magnets to ensure that iHc is greater than .5Br. The chart in Figure 9, shows that the aging occurs at between 100 and 300C, which is lower than the thermal treatment previously discussed, which is at 500-1100C.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2 and 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in 7,163,591.

Please review the teachings of Kim and how they apply to the filed claims.

Regarding Claim 2 and 3: Kim teaches at Column 3, Lines 27-37 that the powder included as his magnetic form is between 50 and 500 microns in size. Thus both the magnetic anisotropy direction and the maximum side of these particles would be less than 2mm and 20 mm respectively. Therefore, this range represents an overlapping range with those sizes claimed. It would have been obvious for one of ordinary skill in the art to select from the overlapping portions of these ranges and arrive at the claimed invention. Overlapping ranges have been found to support a prima facie case of obviousness.

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7. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in 7,163,591 as applied to claim 1 above, and further in view of Sagawa in 5,250,255.

Please review the rejection under Kim to understand the scope of Kim's teachings.

Kim does not teach using the fluoride particles in the form of a slurry, which is disposed on the surface of the magnet form before heat treatment.

However, Sagawa teaches a process of making green compacts for sintered magnets comprising a step where powder is added in the form of a slurry. This is done so that poling of the magnet can occur, while the green part is being manufactured. This poling allows the poles of each particle to align along the magnetic field in order to increase the overall quality of the magnet. The discussion of this process can be seen in the section entitled "Wet Die Pressing" and can especially be noted in Column 28.

The use of a Wet Die Pressing step in the process of Kim could easily be introduced prior to heat treatment and could be introduced in necessarily the same manner as described by Sagawa. Such a process would ultimately improve the resin magnets as prepared by the particles of Kim as poling would increase the overall quality of the magnet, due to the fact that the sintered

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magnetic particles of Kim would become aligned with the magnetic field. To do so, the R-fluoride alone or the R-fluoride along with the magnet would be disposed in a slurry. Thus the surface of the magnet in either situation would be in contact with such a slurry. Such a combination is thus highly motivated and would be well within the capabilities of one of ordinary skill in the art.

Furthermore the two pieces of art come from analogous art as they both deal with the production of sintered magnetic forms.

8. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in 7,163,591 as applied to claim 1 above, and further in view of Mitsuji in 5286366.

Please review the rejection under Kim to understand the scope of Kim's teachings.

Kim does not teach using an acid, alkali, or organic solvent to clean the magnet form.

Mitsuji, however, teaches that it is beneficial to add several other layers to the surface of a Nd-Fe-B type magnet due to this composition's inherently poor chemical resistance. This is improved by adding nickel and copper coatings to prevent chemical degradation (See Abstract). In order to add this layer the magnet must first have its outer surface layer removed, since this layer has been

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degraded by the manufacturing process. The magnet is thus etched with nitric and acetic acid to remove from 5-20 microns (See Column 5, Lines 10-35). The layers are then applied to the magnetic material. The use of this process would clean the surface of the magnetic form in order to allow the plating process to occur. Thus under this interpretation the particles of Kim are an initial magnetic form, where the formed particles represent a final magnetic form. This interpretation is possible since the form is never defined explicitly.

One of ordinary skill in the art would have found that this process of Mitsuji would be highly applicable to the magnetic material as described by Kim. The process would then be conducted on a sintered body made from the magnetic forms of Kim to produce a high quality product that was applicable to situations where a corrosion resistant magnet was needed.

9. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in 7,163,591 as applied to claim 1 above, and further in view of Hamada in 6777097.

Please review the rejection under Kim to understand the scope of Kim's teachings.

Kim does not teach using an acid, alkali, or organic solvent to clean or dispose the powder on the surface of the magnet form.

Hamada, however, teaches that it is beneficial to add a composite coating to the surface of a Nd-Fe-B type magnet due to this composition's inherently poor chemical resistance. This is improved by adding a silicone resin along with flakes of fine powder to prevent chemical degradation (See Abstract). In order to add this layer the magnet must first have its outer surface layer removed, since oxidation must be removed from the surface of the magnet. The magnet can thus be put through several different processes to attain this goal, such as shot blasting or cleaning with caustic fluids (See Column 5, Lines 30-60). The layers are then applied to the magnetic material. The use of this process would clean the surface of the magnetic form of oxides in order to allow the plating process to occur. Thus under this interpretation the particles of Kim are an initial magnetic form, where the formed particles represent a final magnetic form. The term magnetic form is never explicitly defined. After dip coating the composite magnet is heat treated to decompose the silicone resin into silica (See Column 5, Lines 5-15).

One of ordinary skill in the art would have found that this process of Hamada would be highly applicable to the magnetic material as described by Kim. The process would then be conducted on a sintered body made from the magnetic

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forms of Kim to produce a high quality product that was applicable to situations where a corrosion resistant magnet was needed.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-14 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 and 11-20 of copending Application No. 11/783639. Although the conflicting claims are not identical, they are not patentably distinct from each other because They outline generally the same process although the conflicting application is a bit more verbose. Regardless, both applications are drawn to the same basic process of heat treating a form in the presence of a rare earth fluoride.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

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